TAMARACK
(*Larix laricina*)

Tamarack, a member of the pine family, also goes by the name of Larch or Hackmatack. Larix is the classic Latin name of the larches. Hackmatack is a corruption of an Algonquian term which roughly translates to "wood used in making snowshoes." The tree can grow in damp, swampy areas, but it does best in well drained soil. Tamaracks grow from Newfoundland and Labrador all the way to Alaska, south along the Great Lakes and along the Appalachians to West Virginia and Pennsylvania.

Hackmatack can grow to 50' or 60' (15-18 m), and seldom more than 2' (61 cm) in diameter. The

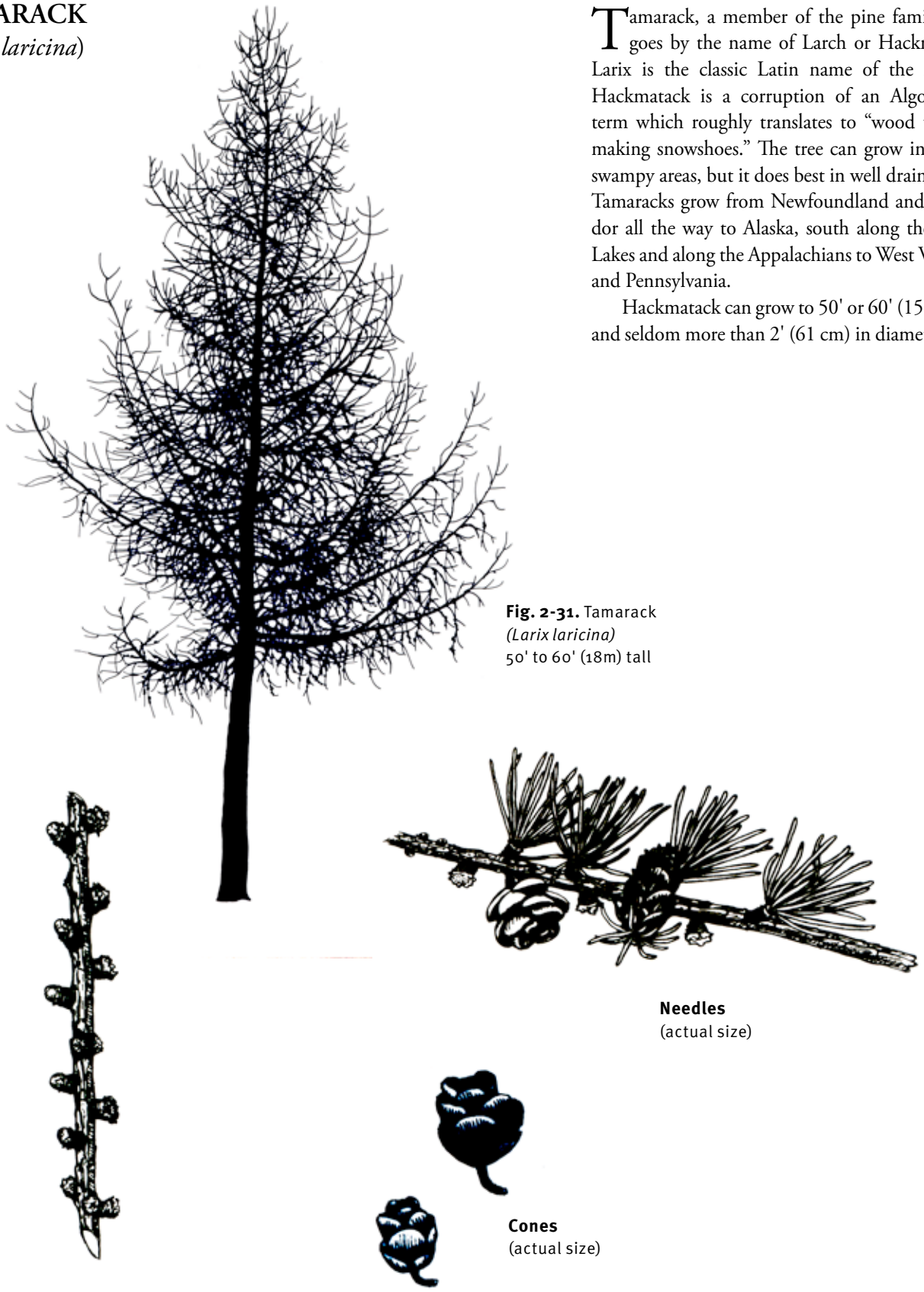


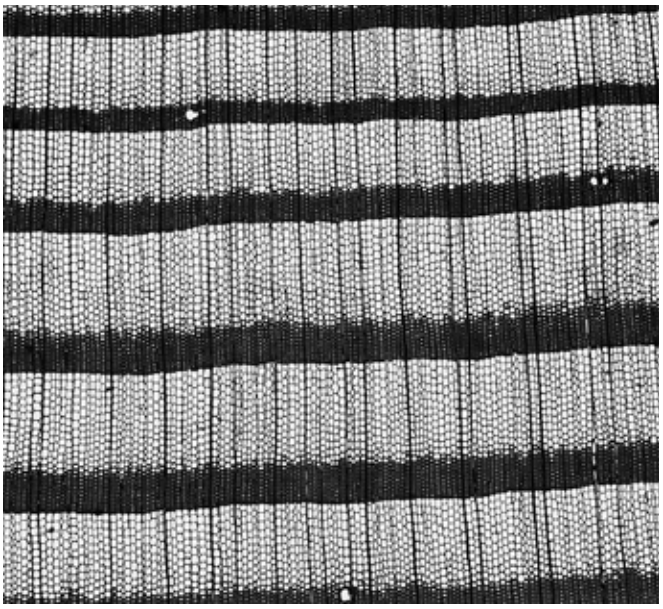
Fig. 2-31. Tamarack
(Larix laricina)
50' to 60' (18m) tall

Needles
(actual size)

Cones
(actual size)

Twig
(actual size)

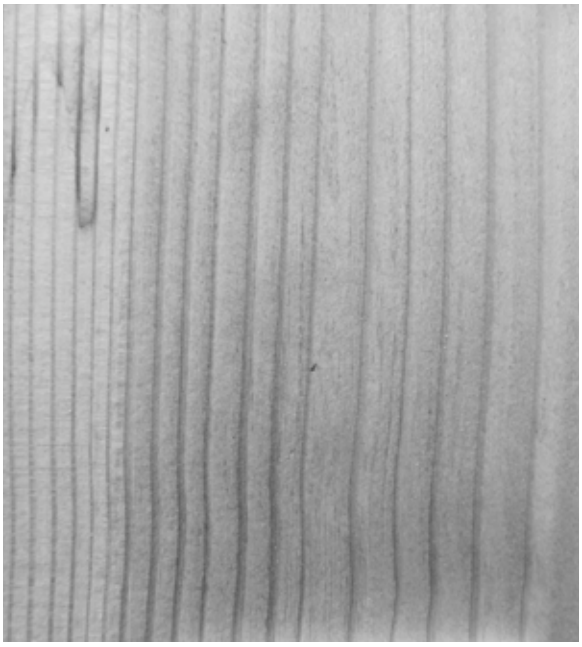
Bark



End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

tree usually has a straight central trunk, but older trees will sometimes form an irregular crown. The slender, soft, light green needles, 3/4" to 1-1/4" (2-3 cm) long, grow singly on new twigs, and in bunches of 12 to 20 on twigs of the previous year. Hackmatack is both coniferous and deciduous. Like bald cypress, the needles turn yellow and shed in the fall. The bark is flaky and reddish brown. Cones are small, only 1/2" to 7/8" (1.3-2.3 cm) long. They start a soft pinkish red color in the spring and mature to chestnut brown in the fall, when they open an release their small winged seeds.

Hackmatack is tough, medium-textured and oily or resinous. The sapwood is relatively narrow and whitish in color, while the heartwood is yellowish brown to reddish brown. Relatively heavy for a softwood, hard and strong, it has a density of 37 lb/ft^3 or .59g/cc. The wood is moderately decay-resistant and can be used in contact with soil for posts, sills and railroad ties. In boatbuilding, the "ships knees" are harvested from the lower trunk where the roots diverge at about 90°. These knees were used to support and strengthen the corners between the hull and the deck. Some knees were even used in barns. Other uses include snowshoes, some interior work, rough lumber and pulp.



Face grain, plain sawn

WHITE SPRUCE
(*Picea glauca*)

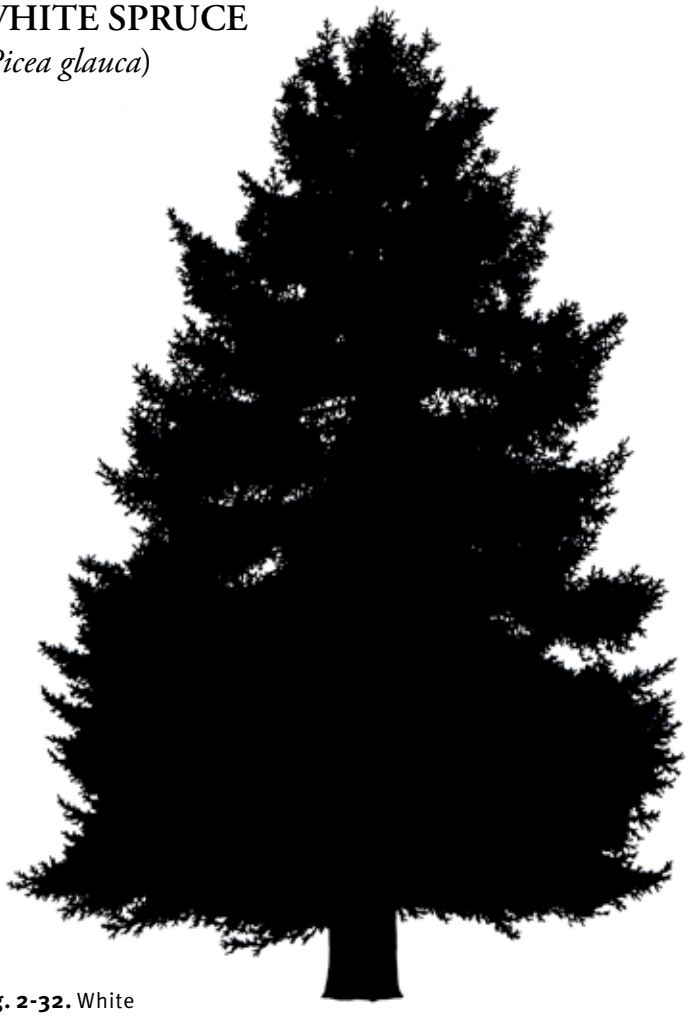
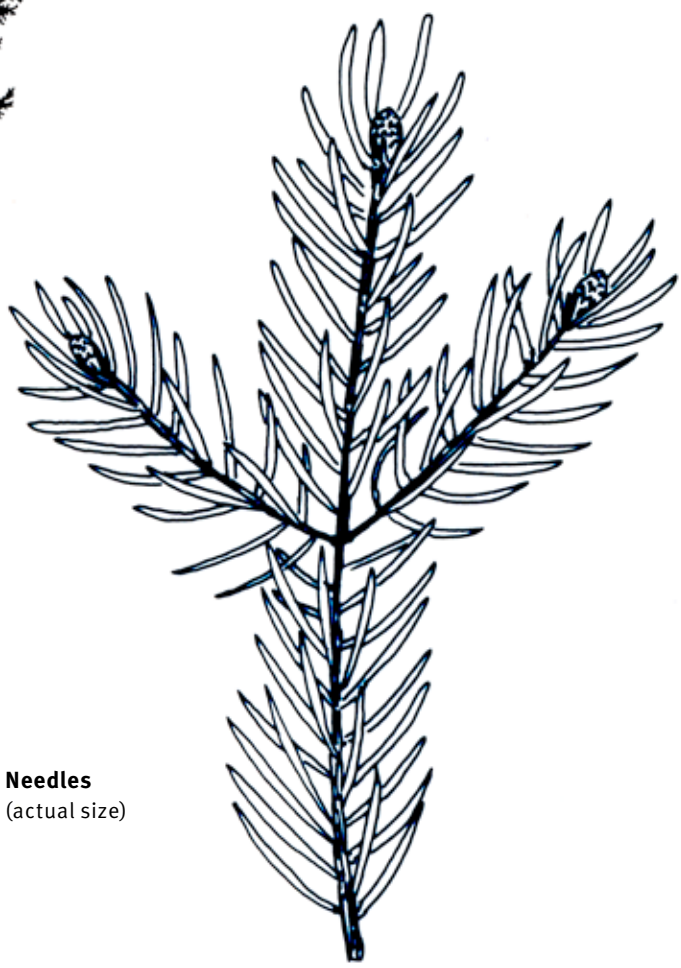


Fig. 2-32. White spruce *(Picea glauca)* 40' to 70' (21m) tall

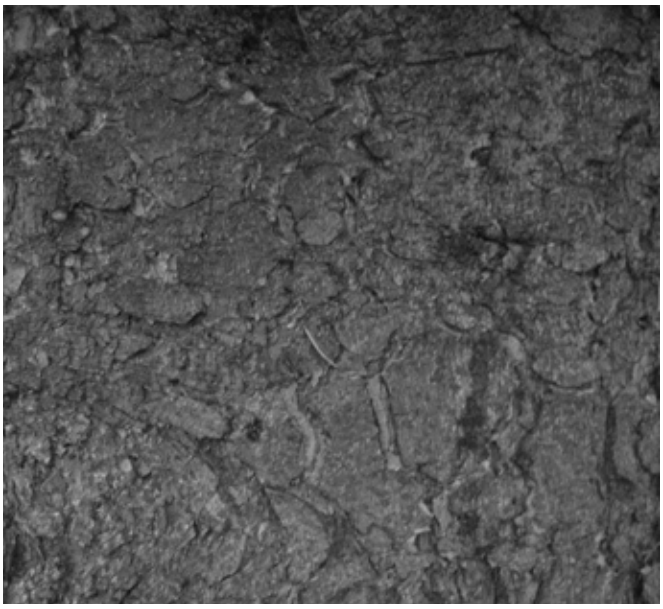
The woods of the North American spruce species are difficult to tell apart. The lumber industry lumps them all together (like white oak and red oak). The group includes black (*P. mariana*), red (*P. rubens*), Engelmann (*P. Engelmannii*), Sitka (*P. sitchensis*), blue (*P. pungens*), Brewer (*P. breweriana*), and white (*P. glauca*)

White Spruce is also known as Canadian spruce, cat spruce or skunk spruce. *Picea* is Latin for pitchy pine, while *glauca* means white or powdery white. White spruce grows at lower elevations and is found throughout the northern part of North America, from Alaska through central and northern Canada, to Newfoundland and Labrador, south through Minnesota, around the Great Lakes and into New England and Nova Scotia. Size varies from stunted trees in the Arctic, to 80'-120' (24-36 m) in parts of Alberta and British Columbia, with 40' to 70' (12-21 m) being more typical.

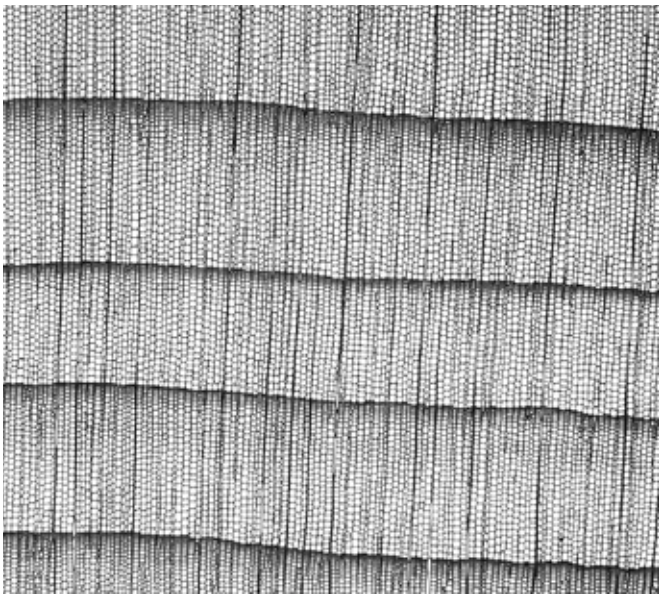
Cone
(actual size)



Needles
(actual size)



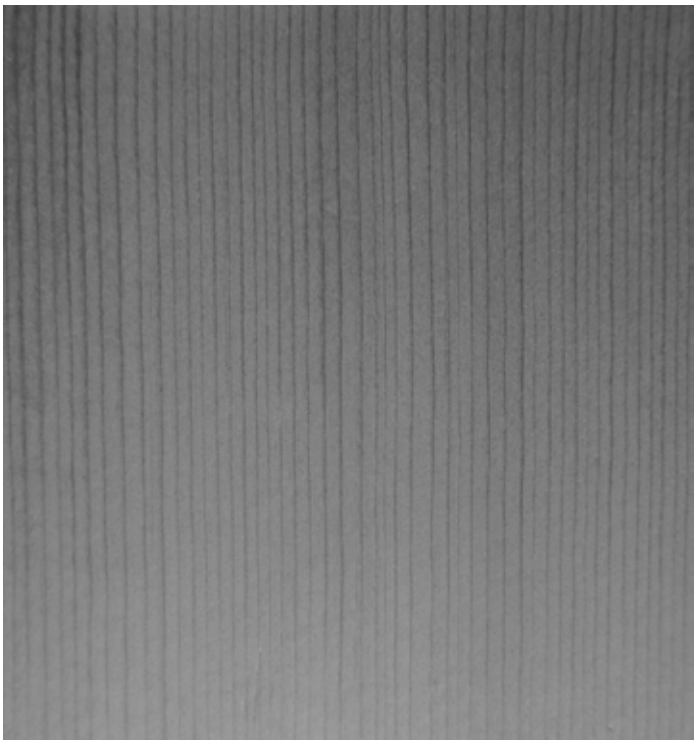
Bark



End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

White spruce is often planted as an ornamental because of its pyramidal shape and drooping branches. Its needles 1/3" to 2/3" long (.8-1.5 cm) grow singly all around the twig. When crushed they often exude a "disagreeable" odor, hence the common name of skunk spruce. The cones of white spruce are slender and oblong, about 2" in length (5.1 cm). Individual scales are blunt-ended, unlike red and black spruce, which have more rounded scales. The new twigs are orange-brown color. Bark on younger trees is gray and relatively smooth, while on older trees it is scaly, gray and only about 1/2" thick (1.3 cm).

White spruce wood, both sap and heart, is soft, light in color and not particularly strong. Resin canals are present. It has a density of about 27 lb/ft^3 or .43 g/cc. The fibrous roots were used by Native Americans for lacing birchbark canoes. Currently it is one of the prime sources of pulpwood for the production of paper. It is also one of the most used timbers for construction 2x material. In the world of music, spruce (depending more on location and width of growth rings) rates highly for soundboards of violins, cellos, guitars, harpsichords and pianos.



Face grain, plain sawn

DOUGLAS FIR
(*Pseudotsuga menziesii*)

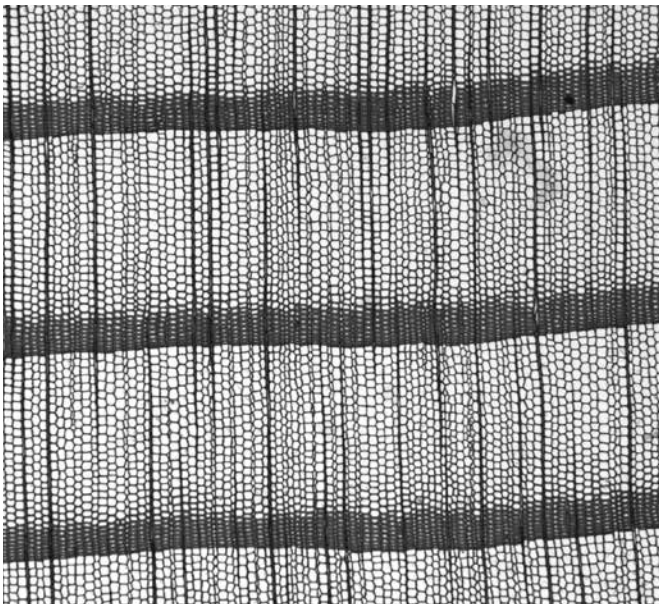
Fig. 2-33. Douglas fir
(Pseudotsuga menziesii)
up to to 300' (92m) tall

Douglas fir is not a fir tree (Abies) at all, but rather a distinct genus, Pseudotsuga. Tsuga is Japanese for the hemlocks, in essence a fake hemlock. In 1791 it was described by Dr. Archibald Menzies who found it growing on Vancouver Island. It was brought to Europe and popularized by David Douglas, hence the common and scientific names. It ranges from Alaska through western Canada, down the West Coast to California, and throughout the Rockies to parts of Arizona, New Mexico, Texas and even into parts of Mexico. It is

Cone
(actual size)

Needles
(actual size)

Bark



End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

a very large, straight-trunked tree, some reported as high as 300' (92 m) or more, with diameters of up to 10' (3 m) in the coastal regions of Oregon, Washington and British Columbia.

Its needles are short, 1/2" to 1-1/2" long (1.3 - 3.8 cm), a grayish green, soft and flat, growing all the way around the twig. The hanging cones are 1-1/2" to 4-1/2" long (3.8 - 11.4 cm). The bark is ridged, dark brown and can be as thick as a foot (30.4 cm). This makes the older trees very fire resistant.

Doug fir sapwood is narrow and light in color. The heartwood is yellowish to reddish brown. It is a strong wood and relatively easy to work, although the soft early wood and harder late wood often causes splintering. Doug fir is used throughout the construction trades for studs, beams, posts, flooring and siding. The large size of the tree can yield beams of tremendous length, width and clarity. It is often quartersawn, which in softwoods is referred to as vertical grain. It is relatively decay-resistant and has a density of about 36 lb/ft^3 (.57 g/cc).

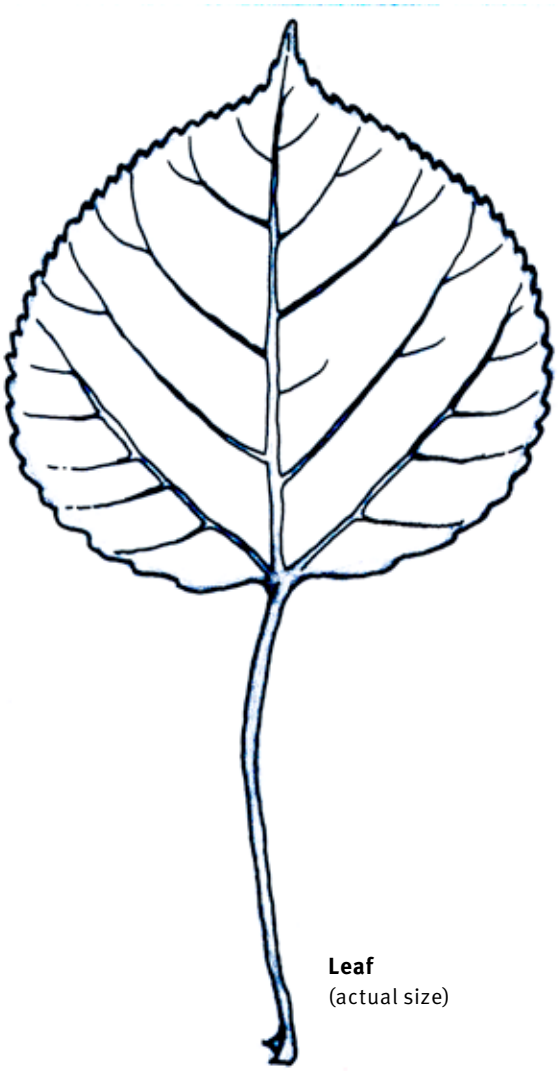
Face grain, plain sawn

POPLAR
(*Populus tremuloides*)

Poplar is not to be confused with Tulip poplar, a separate and more complex family. *Populus tremuloides* does, however, include several other species grouped together by the lumber industry as poplar. These include bigtooth (*Populus grandidentata*), balsam (*P. balsamifera*), eastern cottonwood (*P. deltoides*), black cottonwood (*P. trichocarpa*) and quaking aspen (*P. tremuloides*). Poplar is commonly know as quaking aspen, trembling poplar,

Fig. 2-34. Poplar *(Populus tremuloides)* 40' to 60' (18m) tall

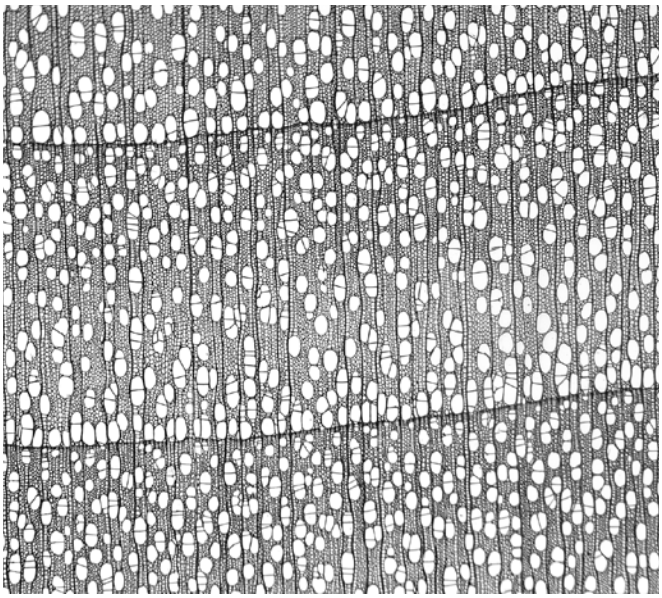
Fruit
(actual size)



Leaf
(actual size)

Twig
(actual size)

Bark



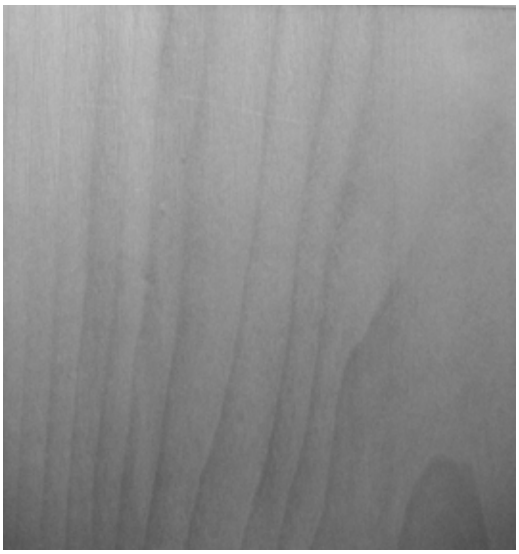
End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

golden aspen or popple (New England). *Populus* is the Latin name for the poplar family, *tremuloides* means trembling or quaking.

It is found throughout most of northern North America, from Alaska through most of Canada to Newfoundland, through the Appalachians to Virginia and Kentucky, west to the Dakotas and down through the Rockies to New Mexico.

Poplar can reach 40'-60' in height (12-18m) and up to 2' in diameter (60 cm). The leaves, on long slender stems, are 1"-2" long (2.5-5 cm) and about as wide, round to heart-shaped with a slight point and finely serrated edges. They flutter in the slightest breeze. The fruit are small capsules on long catkins. Bark is smooth and light grayish green on younger trees, while on older trees it cracks into dark gray ridges.

The sapwood is very pale to almost white, while the heartwood is a bit darker and almost beige to light brown. Although the grain is generally straight, it tends to be fuzzy, and the wood warps easily. It has a density of about 25-28 lb/ft^3 (.39-.45 g/cc). Uses include boxes, excelsior, cordwood, veneer, plywood, pallets and carvings. It is not decay-resistant.



Face grain, plain sawn

BLACK WILLOW
(*Salix nigra*)

Salix is Latin for the willows, and *nigra* means black. Willow prefer moist soil and are frequently found along streams and damp lowlands, so it is sometimes called swamp willow. Black willow is found throughout most of the eastern United States from Texas, north through Kansas, Iowa, Minnesota, along the Great Lakes and through southern Ontario to New Brunswick. It can reach heights of 60' to 100' (18-30 m). There

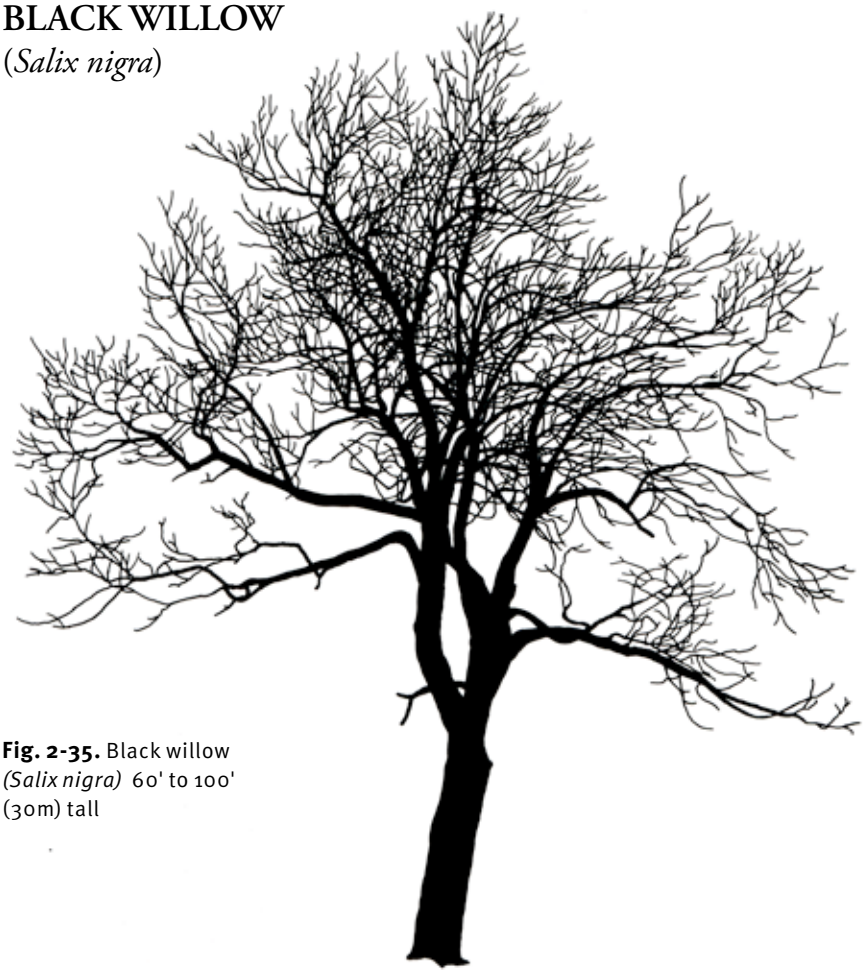


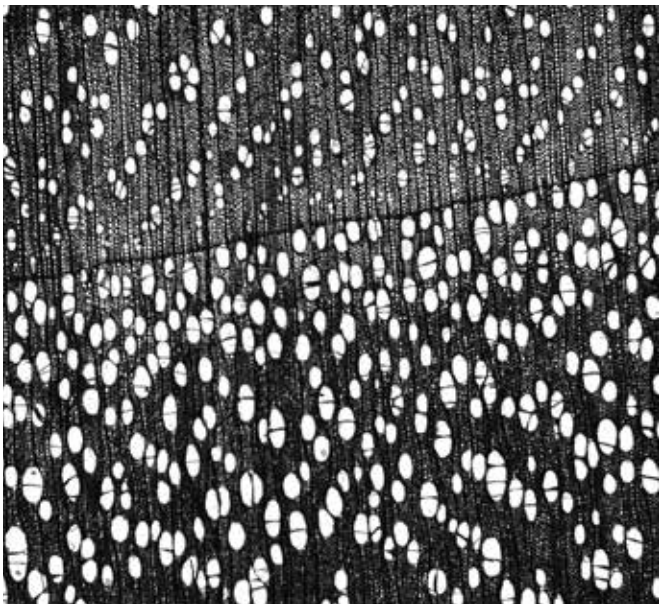
Fig. 2-35. Black willow *(Salix nigra)* 60' to 100' (30m) tall

Fruit
(actual size)

Twig
(1/2 actual size)

Leaves
(1/2 actual size)

Bark



End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

are several dozen willow species native to North America, but only black willow reaches marketable size and is used commercially.

Willow leaves are 3"-6" long (7.6-15 cm), very thin and lance-shaped, with tiny serrations along the edges, long tapering tips and a distinct midrib. Twigs are slender and smooth with small alternating buds. The bark is dark brown to almost black, 1" to 1-1/4" thick (2.5-3.2 cm) with deep ridges and fissures. The fruit forms from upright catkins, small, reddish brown; each seed is hairy and is easily spread by the wind.

Black willow wood has very light, nearly white sapwood and reddish brown heartwood. It is very light in weight, only about 26 lb/ft^3 (.41 g/cc). It is prone to insect damage and decay. It is not used structurally, but rather for baskets, boxes, some furniture and carving. However, it was once the preferred wood for artificial limbs. Its fibrous root system makes it a useful tree in erosion control.

Face grain, plain sawn

Pecan
(*Carya illinoensis*)

Pecan is a member of the hickory family, *Carya*, Greek (karua), meaning nut. Pecan prefers rich, moist soils, and is now cultivated in most of the southeastern United States. Its original range extended from Illinois and Indiana, along the Mississippi River, to Oklahoma, Texas and into Mexico. Pecan, grown in the open, is a very large tree

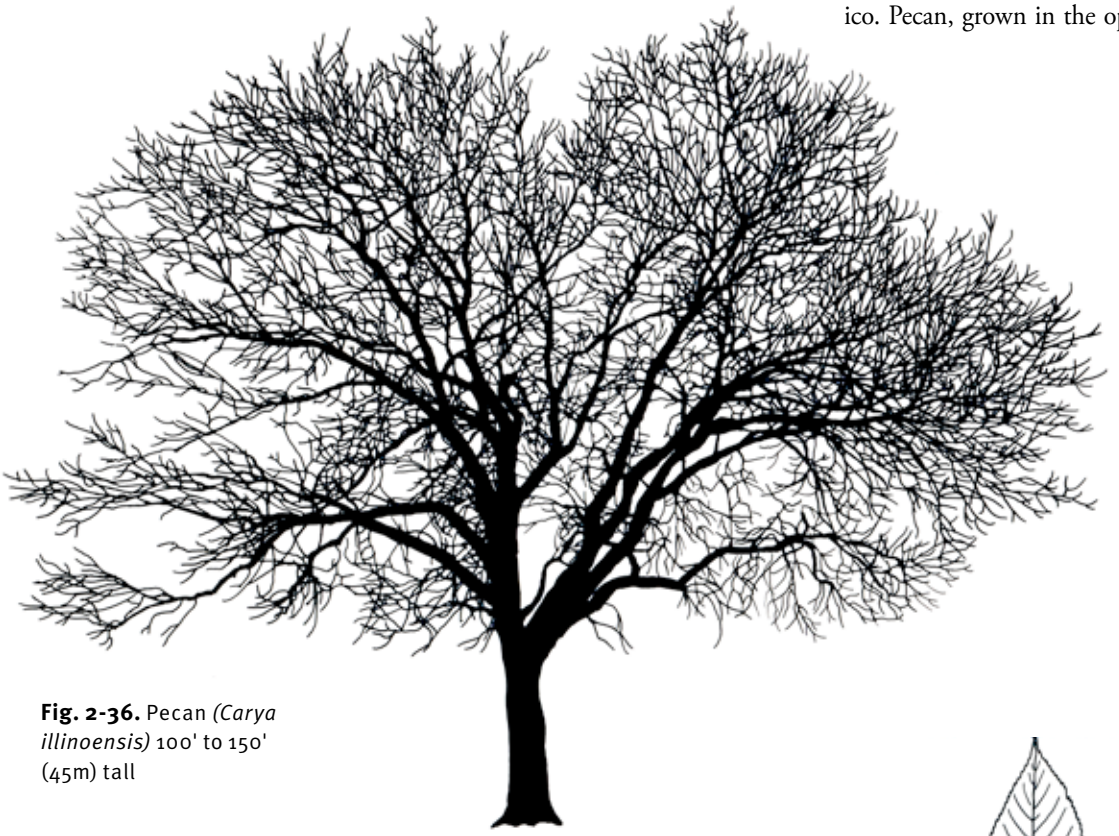
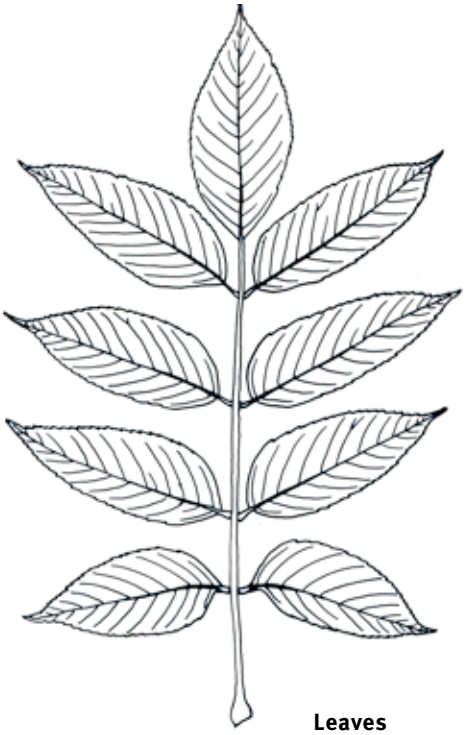


Fig. 2-36. Pecan *(Carya illinoensis)* 100' to 150' (45m) tall

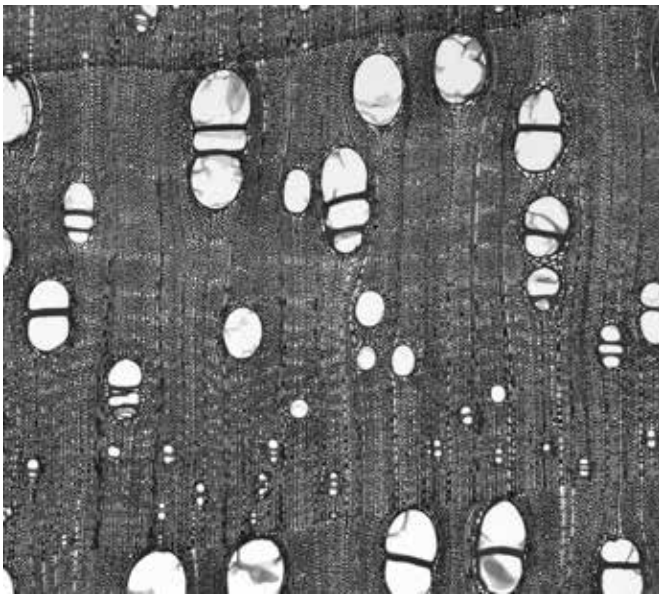
Fruit
(actual size)

Twig
(actual size)



Leaves
(1/4 actual size)

Bark



End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

that can reach from 100'-150' (30-45 m) with a diameter of 2'-4' (.6-1.2 m).

Pecan leaves are long, 12" to 20" (30-50 cm), compound, alternating, with 9-17 leaflets, each 4" to 7" long (10-18 cm) with finely toothed edges. The nuts form in clusters of three to 11. The husks are four-sectioned and relatively thin. Inside, the nuts are also four-sectioned, smooth, brown with black streaks, oval and with a pointed end. Grown commercially, the nuts are actually of more marketable value than the timber. Pecan bark is grayish brown with deep interlocking ridges. It is 1" to 1-1/2" thick (2.5-3.8cm).

Pecan wood is heavy and hard, but not as strong as the other hickories. It has a density of about 46 lb/ft^3 (.74 g/cc). The sapwood is pale tan, while the heartwood is pale brown and reddish brown. Commercially, pecan is used for flooring, furniture, tool handles, ladder rungs, veneer and other interior work. It is not decay-resistant. The wood is in demand as firewood because of its high Btu value. It is also used in making charcoal for smoking meats. As stated previously, pecans are grown primarily for the nuts, which are sweet, easy to shell and popular in pies, pralines, candies and desserts. It is also planted as a shade tree.

Face grain, plain sawn

AMERICAN HORNBEAM
(*Carpinus caroliniana*)

Carpinus is classic Latin for hornbeam, *caroliniana* refers to Carolina. It is also known locally as blue beech, water beech or ironwood, and is a member of the birch family. American hornbeam can be found from New Brunswick, Maine, through southern Ontario to Wisconsin and Minnesota, south to eastern Texas, along the

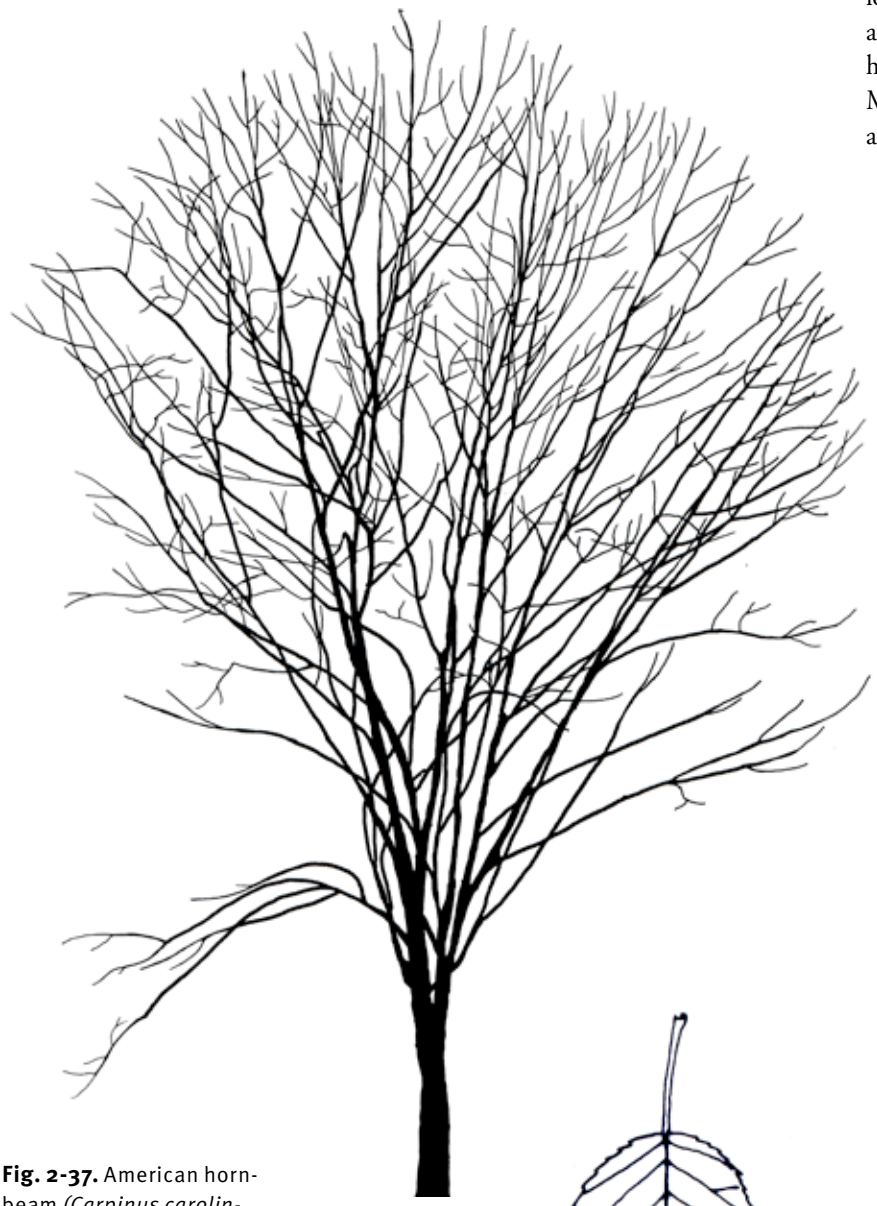
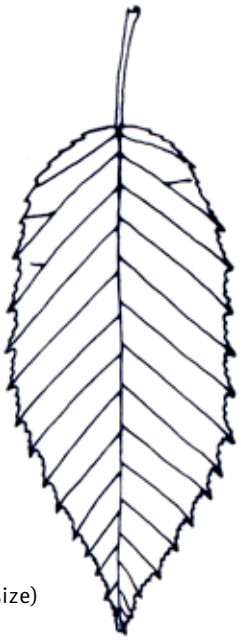


Fig. 2-37. American hornbeam *(Carpinus caroliniana)* 10' to 30' (9m) tall

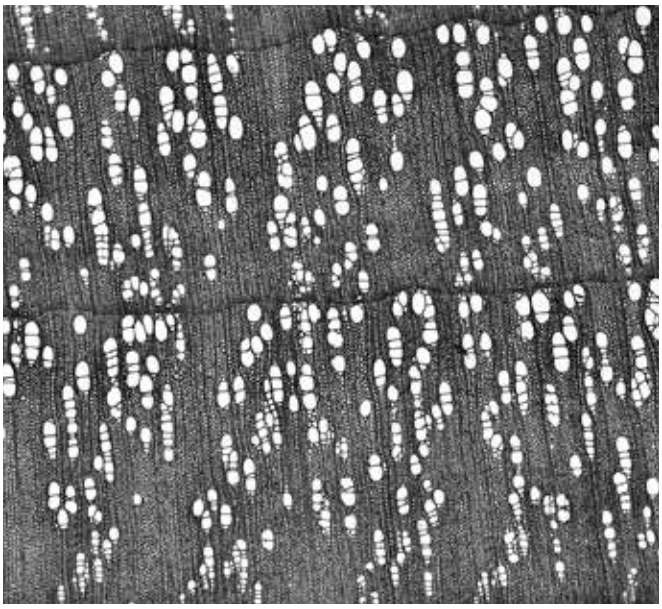
Fruit
(actual size)

Twig
(actual size)



Leaf
(actual size)

Bark



End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

Gulf Coast to the eastern seaboard. Hornbeam does best and is most often found in damp bottomlands and along streams. It is a relatively small tree, usually no more than 10' to 30' tall (3-9 m), but under ideal conditions can grow to 60' (18 m) and 1' to 2' in diameter (.3-.6 m).

The leaves are alternate, oval and pointed, with double-serrated edges, 2"-4" long (5-10 cm) and 1" to 1-3/4" wide (2.5-4.4 cm). They turn a coppery orange in the fall. The fruits are small, nut-like ovals surrounded by pointed leaf-like bracts in opposite pairs in loose, hanging clusters. Twigs are slender and a reddish-brown. The bark is smooth and thin, only 1/16" to 1/8" thick (.15-.3 cm), gray to bluish-gray, hence the name blue beech.

Hornbeam sapwood is nearly white and relatively wide. The heartwood is light brown. Hornbeam is very heavy, 49 lb/ft^3 (.79 g/cc) and strong, thus known as ironwood (related to and also referring to hop hornbeam, Ostrya virginiana). Because of its small size it has little commercial value, but its fine grain makes it an excellent turning wood for knobs and tool handles. It is also used for levers, wedges, shafts and mallets, anywhere a tough wood is required. Hornbeam also makes a fine ornamental tree for smaller spaces.

Face grain, plain sawn

LIVE OAK
(*Quercus virginiana*)

Live oak is a member of the white oak group. It is sometimes called southern oak. *Quercus* is the Latin name for oaks, while *viginiana* refers to Virginia, which is a bit misleading because Virginia is the tip of the northern range of live oak. It is found from coastal Virginia, the Carolinas, Georgia and along the Gulf states to Texas and into Mexico. It is a very impressive and majestic tree, although not nearly as tall as other oaks. It rarely reaches heights above 60' (18 m) but often has a spread of more than 100' (30 m). It usually

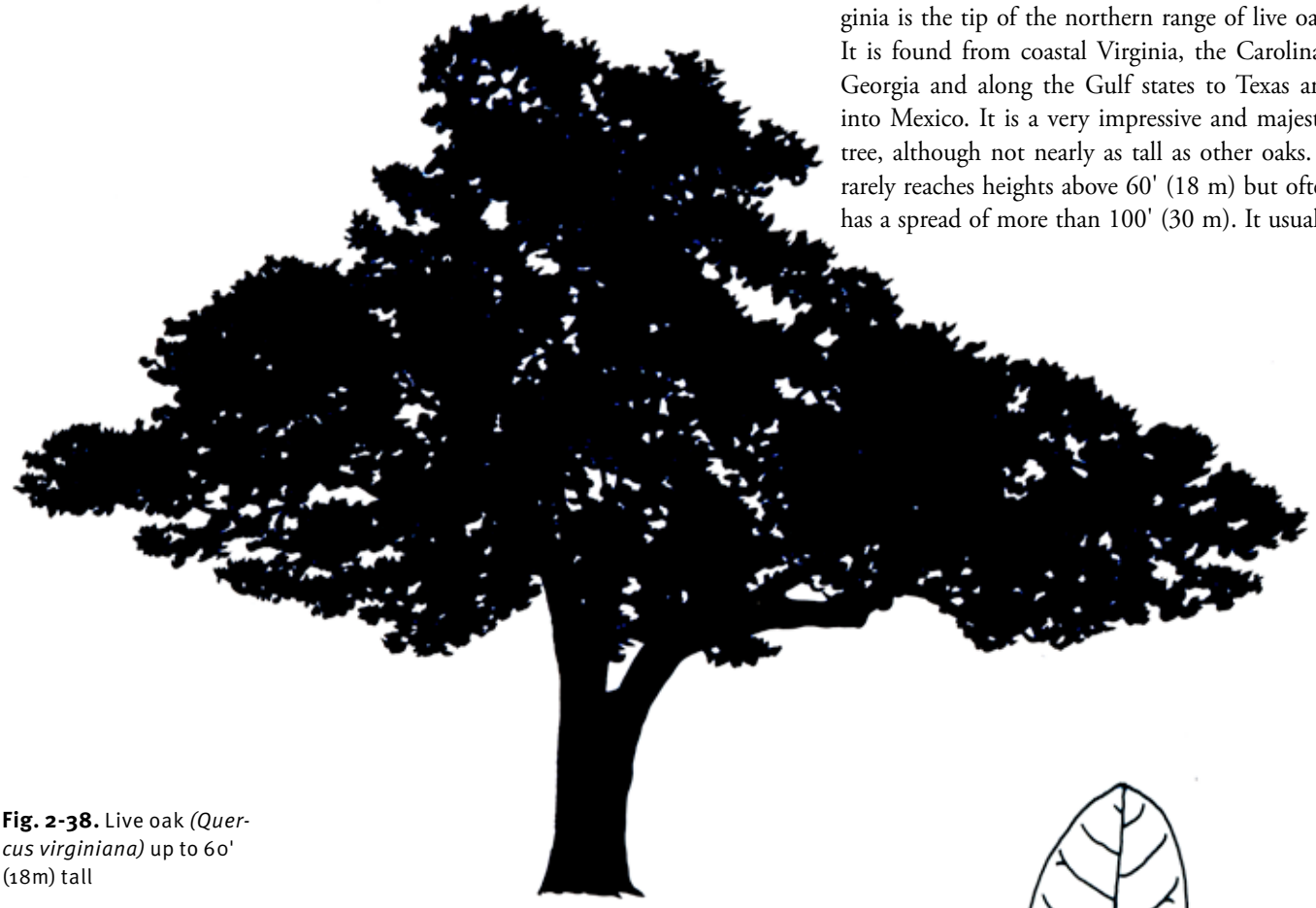
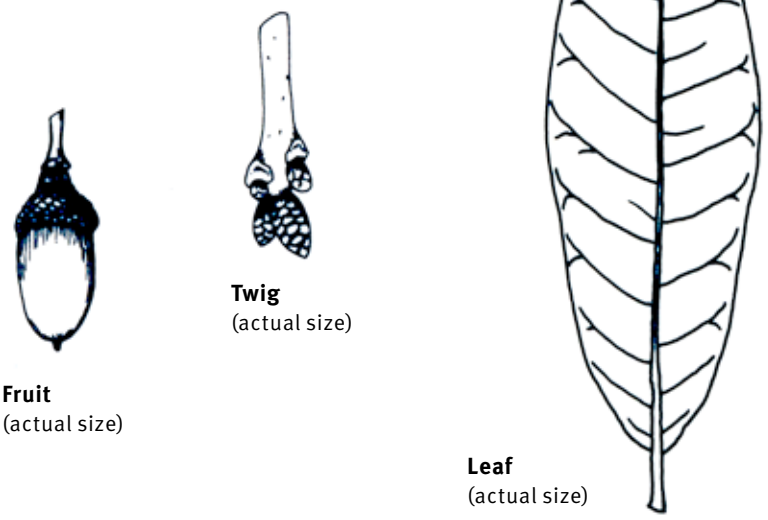


Fig. 2-38. Live oak *(Quercus virginiana)* up to 60' (18m) tall

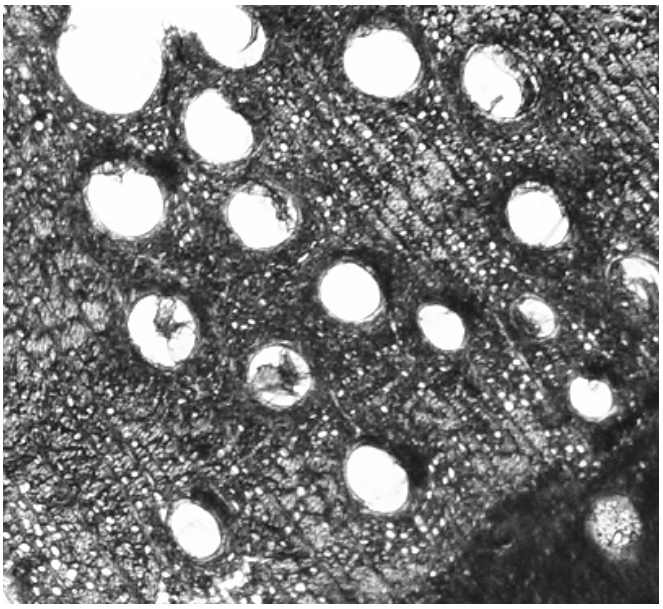


Fruit
(actual size)

Twig
(actual size)

Leaf
(actual size)

Bark



End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

has a short, thick trunk that's up to 7' in diameter (2.1 m) on older trees.

Live oak leaves are dark green on their upper surface and lighter on their underside, elliptical and smooth or slightly wavy. They are 2"-5" long (5-12 cm) and 1/2" to 2-1/2" wide (1.3-6.3 cm). The name live oak comes from the fact that the species is evergreen, not losing its leaves until the next year's leaves are mature. The acorns are slender and oblong, dark chestnut brown and about 1" long (2.5 cm) and roughly 3/8" thick (.9 cm). The bark is dark brown to black, in long ridges, and only about 1" thick (2.5 cm).

The sapwood is very light colored, nearly white, while the heartwood varies from light to dark brown. Live oak is the hardest and densest of the commercial native American hardwoods. It has a density of about 66 lb/ft^3 (1.05 g/cc); in other words, it sinks. Because of its hardness, it is rather difficult to work with hand tools. It takes a good polish and can be used for turnings. However, it was used mostly in shipbuilding. The buttressed trunk joints into the roots or "knees" were used to secure decks to the hull. Planks of live oak were used to construct the U.S.S. Constitution, "Old Ironsides." In 1799, the U.S. Navy started to set aside land to preserve the tree for shipbuilding purposes.

Face grain, plain sawn

MULBERRY
(*Morus rubra*)

Mulberry, also know as red mulberry, is a member of the mulberry family (*Moraceae*), which also includes osage orange and fig, all of which have milky juice or sap. Less than a dozen species are native to North America. Mulberries range from southern New England through southern Ontario, along the Great Lakes to Wisconsin,

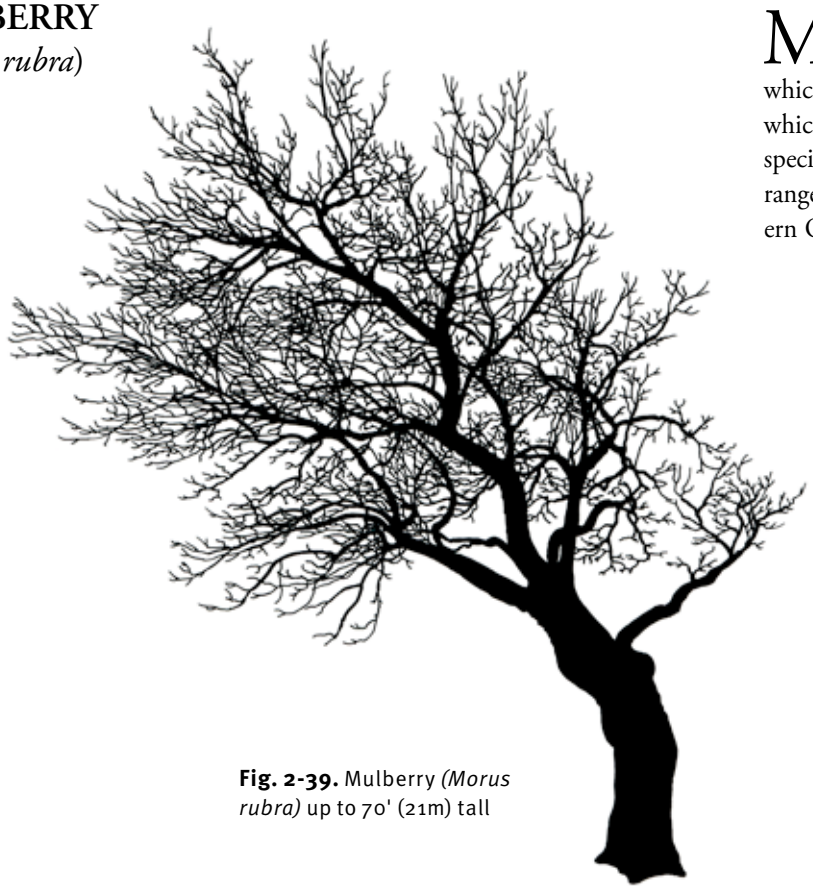
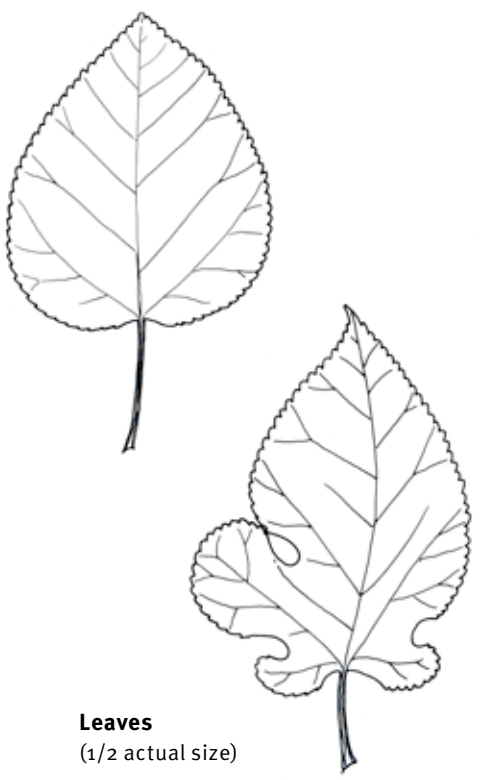


Fig. 2-39. Mulberry *(Morus rubra)* up to 70' (21m) tall

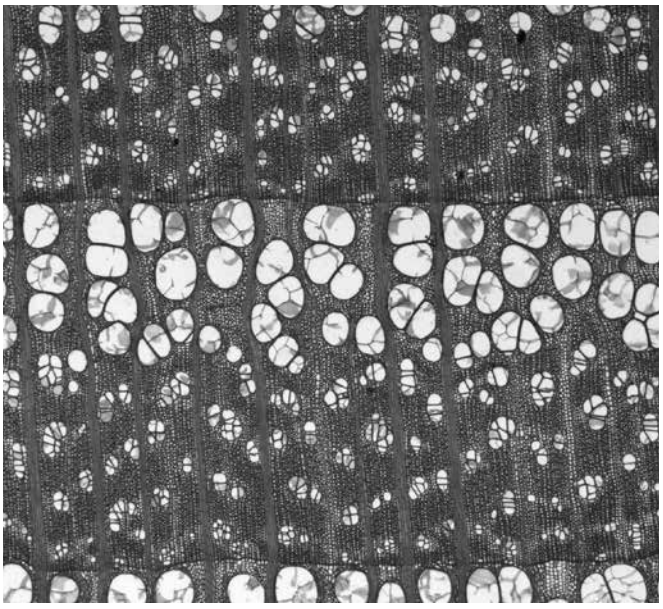
Twig
(actual size)



Leaves
(1/2 actual size)

Fruit
(1/2 actual size)

Bark

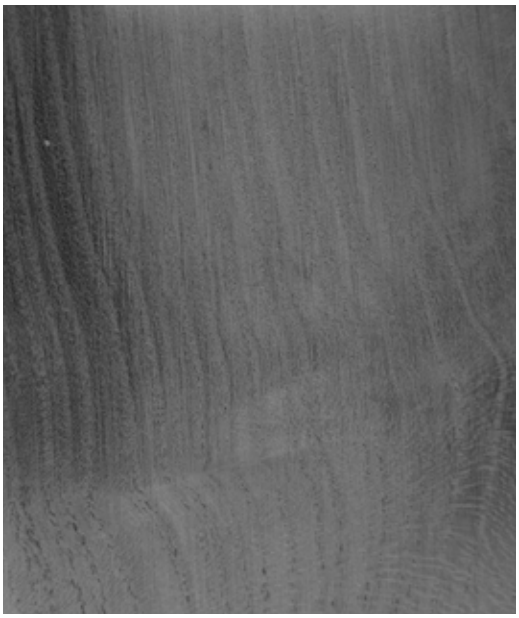


End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

Minnesota, Nebraska, Kansas, and south to Texas and east to Florida. The trees are rarely taller than 60' or 70' (18-21 m) with thick spreading branches.

Mulberry leaves are alternate, simple, wide ovals with pointed tips, serrated, dark green and 3" to 5" long (7.5-12.7 cm), and from 2-1/2" to 4" wide (6.3-10.1 cm) Like sassafras, the leaves can come in a variety of shapes. They are favored by silkworms. The twigs are slender and sort of zig-zagged. The fruit resembles blackberries; they start off red and ripen to purple, almost black. They are juicy, sweet and much favored by wildlife. Mulberry bark is smooth on young trees, becoming 1/2" to 3/4" thick (1.3-1.9 cm) on older trees, reddish to yellowish brown, furrowed and often flaky.

The sapwood is relatively thick and light brown, while the heartwood is yellowish orange darkening with age to dark brown, very similar to osage orange, and very decay-resistant, even when in contact with soil. It is hard and heavy, 43 lb/ft^3 (.69 g/cc). It is seldom harvested and available commercially, but is most often used for fence posts, some furniture and turnings. Also barrels and firewood.

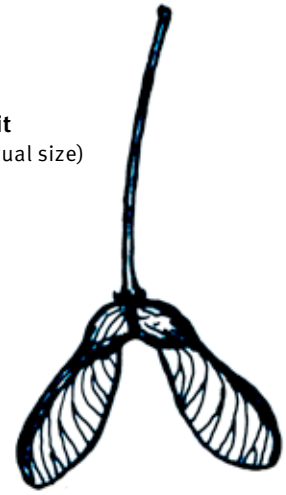


Face grain, plain sawn

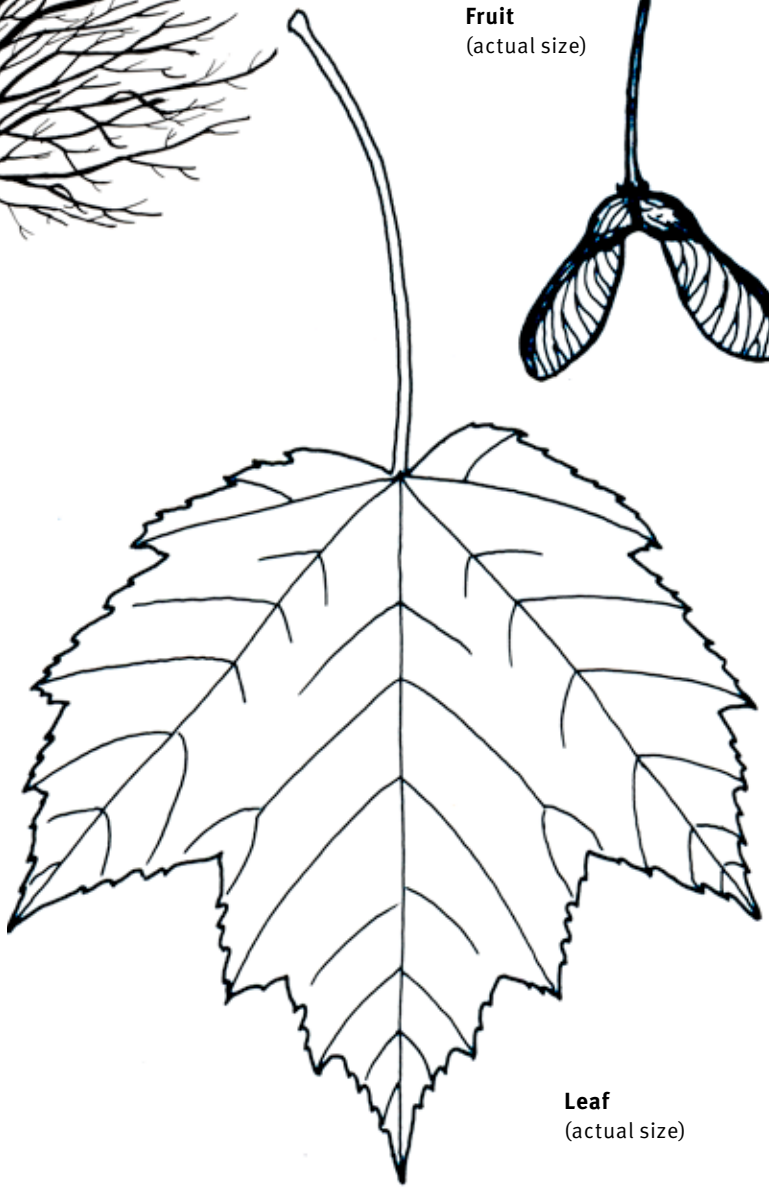
RED MAPLE
(*Acer rubrum*)

Red maple, also know as scarlet, water, white or swamp maple is one of the "soft" maples. The lumber industry also includes silver (*Acer saccharinum*), bigleaf (*A. macrophyllum*), striped (*A. pennsylvanicum*), box elder (*A. negundo*) and the invasive Norway (*A. platanoides*) in this group. Red refers to the flowers, twigs, buds and leaves in the fall. The tree prefers damp areas, along streams and near swamps, and does best in fertile soil. Red maple is found in eastern North America from Nova Scotia and Quebec, through southern

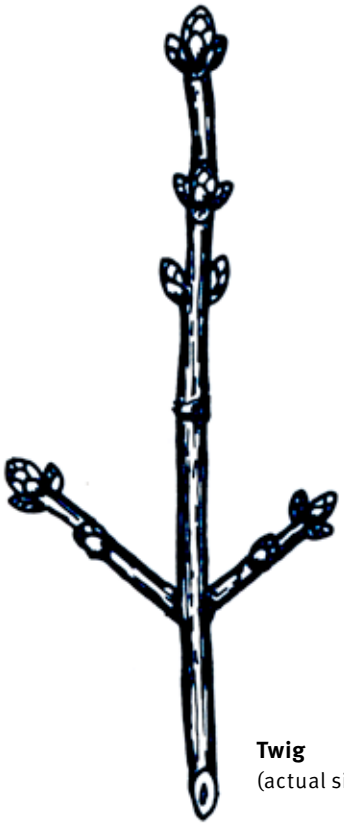
Fig. 2-40. Red maple *(Acer rubrum)* up to 120' (37m) tall



Fruit
(actual size)

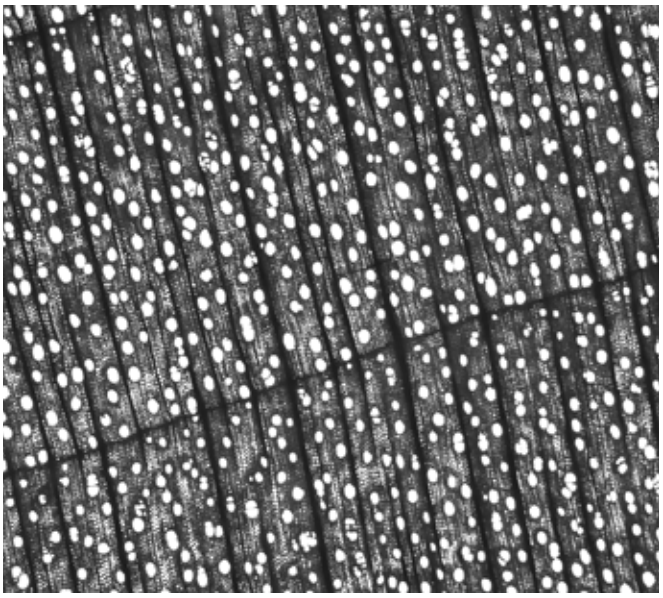


Leaf
(actual size)



Twig
(actual size)

Bark

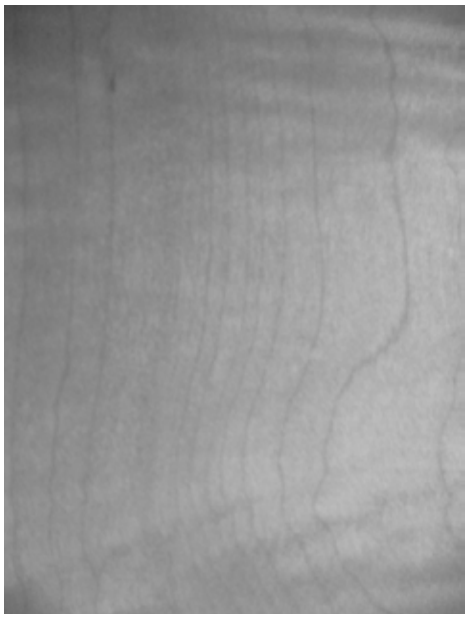


End grain cross section (25x)
Courtesy of Univ. of ME School of Forest Resources)

Ontario to Minnesota and south to Texas. On average, it reaches 60' to 90' in height (18-27 m), rarely 120' (37 m), and can be 2' to 4' in diameter (6-1.2 m).

Red maple leaves are opposite, three-to-five lobed, have double-serrated edges, bright green, turning red, yellow and orange in the fall. They vary from 2" to 5" long (5-12.7 cm) and about as wide. The twigs are slender, smooth and bright to dark red, as are the winter buds. The fruits, double samaras, are reddish-brown and are 1/2" to 1" long (1.3-2.5 cm). Red maple bark is smooth and light gray on younger trees, becoming dark gray and forming broken ridges.

Red maple, along with the other soft maples (Norway, silver, striped and big-leaf), is an important commercial lumber tree. Sapwood is light in color, and the heartwood is light brown, often with streaks of red or darker brown. It is relatively heavy, about 34-38 lb/ft^3 (.53 -.61g/cc) – but not as strong as rock maple – close-grained and easily worked. It glues, finishes and turns very well. Red maple sometimes has quilted or curly grain. It is used in all types of furniture and chair work, interior trim, millwork and veneer. Also crates, flooring, pallets and firewood. It is sometimes used for musical instruments and even gunstocks. It is a versatile, economical and readily available material.



Face grain, plain sawn